Extension
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Ecology and Management of Ring-Necked Pheasants in Missouri

The ring-necked pheasant (*Phasianus colchicus*) is one of the most popular upland game birds in the central and northern regions of the United States (Figure 1). This species, which is native to Asia, was first released into the U.S. in the mid-19th century. Pheasants were first introduced in Missouri during the 1890s, with the first hunting season held in 1901. This initial pheasant population declined rapidly, and hunting was stopped in 1904. Efforts to successfully reestablish pheasants in Missouri began shortly after the state dropped the pheasant hunting season and continued through public and private efforts for several decades.

Figure 1. Male ringnecks, or roosters (left), are recognized for their bright colored plumage, with their head and neck being an iridescent blue-green or purple color with a bright white collar, which gives the species its name. Females, or hens (right), lack the coloration of the males. They are mottled brown with small black spots on their back. Their tail is pointed with black barring and is shorter than the roosters' tail, which can be more than 20 inches long.

The Missouri Department of Conservation (MDC) conducted numerous pheasant research projects and initiated a pheasant release program in 1958. They released about 16,000 birds over the course of the program, which ended in 1971. Afterward, more than 50 years ago, the pheasant populations in Missouri once again began to decline. The rate of decline was relatively steady for about the first 30 years. In the past 20 years, however, the rate of decline in pheasant numbers has rapidly accelerated, primarily due to habitat and land-use changes that have occurred across their range in the state.

The purpose of this publication is to provide landowners with information on improving the habitat on their farms and property for ring-necked pheasants. Most of the practices that are discussed can successfully be integrated with ongoing farm management objectives and will also benefit other ground-nesting upland birds, such as bobwhite quail, as well as a diverse group of grassland birds — such as meadowlarks, dickcissels, bobolinks and field sparrows — that require similar habitats for survival.

Ring-necked pheasant range and population status in Missouri

Pheasant range encompasses about 32 counties in the northern third of Missouri as well as a few additional counties in the state and parts of the Bootheel (Figure 2).

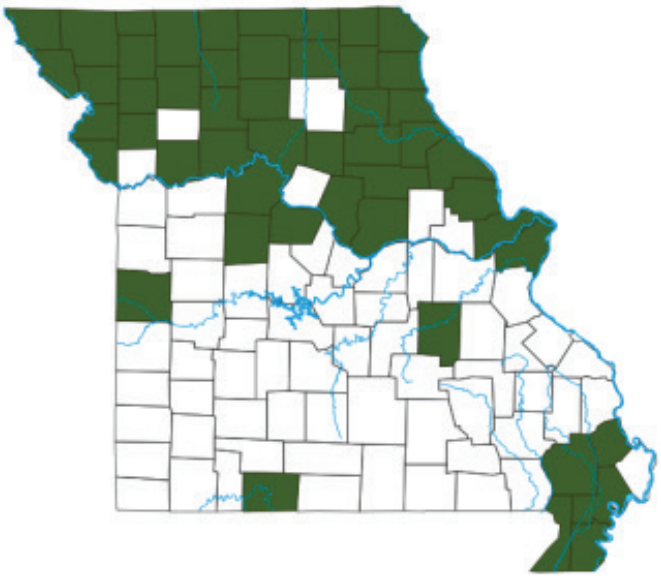

Figure 2. Missouri counties with populations of ring-necked pheasants (shaded) are mostly in the northern third of the state and the Bootheel.

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Ring-necks are generally found in areas with a mix of grain crops along with adjacent permanent cover, such as densely vegetated grasslands, wetland margins and shelterbelts. Many of the farms in the Missouri counties with populations of ring-necks are dominated by fields of row crops and pastures for forage production; however, a large percentage of these grasslands are dominated by tall fescue, a nonnative cool-season turflike grass that provides relatively poor habitat conditions for wildlife. As a result, the vegetation required for nesting and brood-rearing as well as for escape cover has been lost or is very limiting in many of these areas.

As mentioned earlier, pheasant populations in the state are continuing a downward trend. Each year, the MDC conducts a roadside survey from Aug. 1 to Aug. 15 to estimate the populations of ring-necked pheasants and bobwhite quail. For pheasants, MDC conservation agents count the number of birds seen along 73 standardized 30-mile routes. The 2024 statewide count of 0.22 pheasants per 30-mile route was down 39% compared to 2023. It was determined that pheasant populations continued to decline in northern Missouri primarily due to a loss of nesting and brood habitat, especially in areas with fields that were once enrolled in the Conservation Reserve Program (CRP) and were placed back into crop production at contract termination. This loss of habitat had a negative impact on the overall pheasant population across this area of the state.

Biology and life history

Before making management decisions, it is important to understand the biology and life history of ring-necked pheasants. Pheasants begin to mate during April, as day length increases, and can continue to breed throughout the spring and into July. They are polygamous, which means that one rooster will mate with numerous hens. A rooster normally establishes a territory, and hens establish a nest site in areas of suitable cover. Nests are often located in shallow depressions on the ground and are lined with vegetation such as grass and forbs. Hens will lay 10 to 12 olive brown or green buff eggs at a rate of one per day. Two hens may use the same nest, resulting in large clutches of eggs.

Nest success determines whether a population of pheasants will increase or decrease within an area. Unfortunately, nest success rates are variable and average only about 40% to 60%. Nests are destroyed by farm machinery, by predators — including hawks, owls, skunks, snakes, foxes, raccoons, and coyotes — or due to environmental conditions such as heavy rainfall and flooding. Hens may abandon a nest but will usually try to renest and produce a second clutch of eggs.

Chicks are hatched after an incubation period of 23 days. They are precocial in that they are fully feathered and can immediately walk from the nest after hatching. Chicks are able to run within minutes of hatching and develop quickly as a result of feeding on a protein-rich insect diet. They are able to fly short distances within seven days of hatching. However, for the first few days of life they are unable to regulate their temperature and are dependent on the brooding behavior of the hen. During this time, chicks can die of exposure in periods of cool, wet weather.

Chicks remain with the hen for up to seven weeks. The hen will attempt to lead chicks into areas with abundant insects, such as locations made up of a diversity of forbs and legumes. At 7 weeks of age, young pheasants molt their juvenile feathers and begin to develop adult plumage and coloration. Chick survival averages 50%. The average life span for male ring-neck pheasants is about 10 months and for females is about 20 months. However, life span varies considerably based on the quality of habitat and the severity of winter weather. In some years, more than 90% of adult pheasants survive the winter, but in other years survival rate can be as low as 20%, especially when habitat conditions are poor.

Adult roosters molt their feathers in the summer but are fully colored by early fall. Juvenile roosters, the young of the year, may be fully colored or barely have any color at all by fall, depending on when they hatched. Adults weigh about 2½ pounds and have a spur located on their legs between the foot and knee. Spurs can vary from just a nub on a young male to more than ¾ inch on an adult male. Spurs of juveniles are dull colored and have a soft, blunt point. Mature roosters have shiny black, sharply pointed spurs.

Adult hens weigh about 2 pounds and have mottled brown feathers. This coloration is an adaptation to being a ground-nesting bird, to limit detection of the hen by predators during the nesting period.

Ring-necked pheasants are nonmigratory resident birds, staying in the same general area year-round. They may range over several hundred acres, depending on the quality of the habitat in the area. They are found in areas with abundant grass cover mixed with agricultural grain crops. Individual birds will typically range less than a square mile daily under optimal habitat conditions, but some birds will roam farther to find areas with food and cover. Figure 3 depicts an adult rooster in flight and a rooster and hen feeding. Pheasants are found in heavy cover when roosting or loafing but will venture into open fields when feeding. They are swift runners. Only flushing when threatened, pheasants rise with short, rapid wing beats and fly until locking their wings and gliding into protective cover. They normally fly about 30 to 40 miles per hour but can fly faster when pursued.

Figure 3. An adult rooster in flight (left) and a rooster and hen feeding in an open field (right).

Habitat requirements

Habitats that promote the growth of vegetation that provides ample sources of food and the cover requirements for protection and survival are critical for ring-necked pheasants. The three broad habitat components important for ring-necked pheasants are nesting, brood-rearing and winter cover sites.

For most of their life history, pheasants use grasslands for food, nesting and raising broods. The optimal grasses used are mixtures of native warm-season grasses consisting of big and little bluestem, Indiangrass, sideoats gramma and switchgrass. The clumpy growth structure of these native grasses promotes the growth of native forbs (i.e., annual broad-leaved herbaceous vegetation) that are used for nesting and brood cover and are an important source of foods (Figure 4). This type of cover is typically found in dense grasslands, such as in fields enrolled in the CRP; windbreaks and shelterbelts; overgrown road ditches and fencerows; field edges and idle corners; and shrubby odd areas. These areas are also important for providing winter cover.

Figure 4. Native warm-season grass fields (left) as well as areas with mixtures of grasses and shrubby cover (right) provide pheasants with both nesting and winter escape cover.

Various agricultural practices affect nesting cover, winter cover and the foods available in the pheasant's diet. Practices such as no-till farming, strip cropping, field buffers, delayed haying, cover crops and low to moderate cattle stocking rates are beneficial for pheasants. Minimizing the use of herbicides and other pesticides, especially in field borders, is also beneficial.

Food and water

Adult pheasants and chicks eat insects such as grasshoppers, crickets, leafhoppers and caterpillars during the spring and summer months. Waste grains of crops such as wheat, sorghum, corn and sunflowers are readily used in the fall and winter. Seeds from native forbs, such as ragweed and native sunflowers; legumes; and some grasses are also important fall and winter foods. Green vegetation — including grasses, native legumes and alfalfa — is consumed year-round when available. A pheasant's diet will provide an adequate amount of water, thus ponds and other water sources are not needed, although they will be used if available, especially during periods of drought.

According to the MDC, the top five cultivated foods for ring-necked pheasants, in order of importance, are corn, soybeans, wheat, grain sorghum and oats. Usually less than 15% of their diet will consist of fruits such as grape, sumac, coralberry, rose hips, poison ivy and bittersweet. Insects make up 10% to 20% of their diet.

Nesting habitat

Nesting cover is often limiting for pheasants, particularly in areas with intensive farming. The lack of quality nesting habitat is a limiting factor that needs to be addressed on most farms. Pheasants prefer to nest in dense grass cover. Because pheasants nest in early summer, it is important that residual grass cover be available from the previous growing season. Thus, some areas should not be hayed or heavily grazed during the previous season. May and June are the primary months for nesting, although nesting can occur in mid-July and August. To maximize pheasant nesting habitat, avoid disturbance to nesting areas as late into the summer as feasible. Consider maintaining at least 10% to 20% of your property in good nesting cover. If possible, nesting cover should be arranged in large blocks, preferably of at least 40 acres, to reduce predation of pheasant nests (Figure 5).

Figure 5. Blocks of dense grass cover (left) and mixtures of native grasses and forbs (right) provide excellent nesting habitat.

Alfalfa can provide good nesting cover; unfortunately, it can also negatively affect nesting success as the first cutting of alfalfa hay usually occurs during the peak nesting season. When haying grass, consider raising the mower to a height of 10 inches so birds can still nest in that area. When haying alfalfa, consider leaving 50-foot buffers around the edge of the field for nesting areas.

Figure 6. Field borders around crop fields composed of grasses and forbs can also provide nesting cover.

Figure 7. Brood-rearing habitat consists of a variety of vegetation, which can include native grasses, forbs and legumes, fallow fields, wheat stubble and other types of vegetation that is accessible by the chicks and harbors an abundance of insects.

Where crops are grown, simply maintaining grassy field borders and corners will provide at least some nesting habitat (Figure 6).

Although not a substitute for permanent native grass cover, winter wheat in a crop rotation can provide early nesting cover. These fields are usually established in large blocks and can provide a dense cover during the nesting season, and winter wheat is typically not harvested until early summer. The use of stripper headers also leaves taller wheat stubble for additional nesting attempts and brood-rearing cover in the summer. Fields enrolled in the CRP and pastures with native warm-season grasses also provide excellent nesting cover. In native warm-season grass pastures, make sure that livestock stocking rates are low enough so that dense grass cover exists April to July. Plan prescribed fire so at least one-third of the potential nesting cover is unburned during any year.

Brood-rearing habitat

Brood-rearing habitat is also crucial for pheasant reproduction, but it is a habitat component in short supply on most farms (Figure 7). Pheasant chicks feed almost exclusively on insects during the first few weeks of life. Areas that contain an abundance of insects also tend to have a large percentage of native forbs and legumes. Some agricultural crops, such as alfalfa, have high numbers of insects as well, assuming that pesticides are not used and haying is not conducted during the brood-rearing season, May to August. Harvested winter wheat fields can provide brood-rearing cover provided the stubble that remains after harvest is more than 10 inches tall. The use of herbicides to control summer weeds should be avoided. Wheat stubble and annual forbs provide cover, insects and seed for pheasant adults and chicks.

The structure of the brood habitat is also important. It should be fairly open at ground level so as not to impede the movement and accessibility of young chicks. It should also have overhead cover to shield the area from the sun and predators.

Nesting habitat and brood habitat can exist on the same area assuming grass, forbs and legumes are all present. To maintain quality brood habitat, periodic disturbance is necessary as grassy areas tend to become thick with litter accumulation over time. Litter accumulation not only impedes chick movement but also leads to a decline in the abundance of forbs and legumes — and thus insects. To stimulate good brood habitat, use prescribed fire, strip disking, strip herbicide applications, interseeding forbs and legumes, cattle grazing or a combination of these practices every three years to five years.

Winter cover

Winter cover is important to maintain high rates of overwinter survival. Winters in northern Missouri can be prolonged with snowy and icy conditions. During such winters, dense cover adjacent to food resources is critical. Areas of dense herbaceous and woody vegetation provide predator protection and thermal cover. Areas of thick stands of warm-season grasses — such as switchgrass, Indiangrass and big bluestem — or cattails around ponds can provide winter cover.

Ring-necked pheasants will use windbreaks and shelterbelts containing conifers during extreme winter weather. If you plant shelterbelts, use noninvasive, low-growing shrubby species. Although eastern red cedar provides good thermal cover for pheasants, it is highly invasive in grasslands and requires periodic prescribed fire to keep cedars from becoming a dominant presence.

Consider planting plums, dogwoods and other dense native shrubs, such as blackberries. Abundant food near this dense cover is important to minimize exposure of birds to weather and predators and to minimize travel between cover and food. Ring-necked pheasants use fields of grain crops, such as corn or grain sorghum, during fall and winter. These crops provide high-energy foods that are important for overwinter survival. Crops left standing in fields are important to pheasants and need to be available to them during severe winters, particularly those with heavy snowfall. Pheasants also eat native forb and legume seeds during winter months.

Table 1. Cover-type rating for pheasants in Missouri.

Cover type	Nesting cover	Brood rearing	Food value	Winter cover
Corn	Poor	Fair	Excellent	Fair
Winter wheat	Good	Good	Good	Poor
Grain sorghum	Poor	Fair	Excellent	Excellent
Forage sorghum	Poor	Excellent	Good	Excellent
Alfalfa	Good	Excellent	Excellent	Poor
Native grass with forbs and legumes	Excellent	Excellent	Good	Good
Grass waterways	Fair	Fair	Poor	Fair
Roadside ditches	Fair	Fair	Fair	Fair
Shelterbelt	Fair	Fair	Fair	Excellent
Weedy field corners and field borders	Good	Excellent	Good	Good

Notes on rating criteria:

- Winter cover ratings for annual grains — corn, winter wheat, grain sorghum and forage sorghum — are for crops left standing. Harvested crops with standing stubble would rank lower.
- Nesting cover rating for alfalfa is based on alfalfa fields that are not hayed. Alfalfa fields hayed during April to June would be rated as poor.
- Brood rearing and food rating for native grass assumes there is a good mix of forbs and legumes and that periodic disturbance is taking place to produce these food plants and decrease ground litter.

The keys to quality pheasant habitat

- Undisturbed nesting cover between May and July
- Good brood habitat in the summer
- Well-distributed protective cover in winter
- Ample food sources near both nesting and brood habitat

These conditions should be present within 150 acres, which is the average home range of a pheasant. Table 1 provides a cover-type rating of various crops and vegetation for their ability to provide nesting, brood and escape cover as well as a source of food.

Additional tips for improving pheasant habitat on your property

- Avoid the overuse of tall fescue in pastures; tall fescue is a nonnative cool-season turfgrass that grows very thick and can spread into areas where it is not wanted. In addition, tall fescue does not provide the habitats required for ring-necked pheasants or other grassland birds, such as bobwhite quail. Steps can be taken to control or renovate pastures with tall fescue as well as to include native warm-season grasses as a part of a forage system.
- Establish vegetative buffers adjacent to ditches, ponds and wetland areas. These buffers should be at least 30 feet wide to be most effective.
- Delay mowing and haying until after nesting season, which generally ends around July 15 in Missouri. If haying is done before then, consider installing a flushing bar on your equipment to reduce hen mortality. Cut hay beginning in the middle of the field working outward to allow pheasants to escape the field through the uncut grass. Avoid mowing roadsides and ditches if possible.
- As discussed earlier, establishing vegetative field borders around agricultural fields can pay big dividends (Figure 8). These areas enable pheasants

Figure 8. Field borders consisting of grasses (left) and grass and forb mixtures (right) provide areas around crop fields that provide nesting and brood-rearing cover.

to use crop fields with limited exposure to predators. Some birds will nest within these locations as well. Field borders should be at least 30 feet wide, although wider widths are preferred. Refrain from disking or cultivating field corners in center-pivot irrigated fields.

- Leave brushy fencerows, windbreaks and other uncultivated areas for escape cover.
- Plant terraces and grass waterways in native warm-season grasses, such as little bluestem, big bluestem, Indiangrass or switchgrass. Avoid using thick turflike grasses, such as tall fescue and smooth brome.
- Manage native warm-season grasses with periodic prescribed fire to decrease their dense growth and encourage the growth of native forbs (Figure 9).

Figure 9. Prescribed fires maintain stands of native warm-season grasses and promote the growth of native forbs and legumes. Burn only one-third of a field at a time, if possible, and make sure to seek technical assistance and professional advice from Pheasants and Quail Forever or MDC before burning.

- In grass fields, strip disking may also be used to stimulate the growth of forbs and legumes. Consider conducting a disturbance in half of the field each year to allow for nesting and brood cover (Figure 10).

Figure 10. Strip disking in winter can be used to set back plant succession in grass fields to promote both nesting and brood cover. The vegetation regrowth during the following late spring pictured here shows the portion of this warm-season grass field not disked on the right and the disked portion on the left.

- Maintain nesting and brood cover in grass fields. Pheasants use the previous season's perennial grass cover for nesting. Make sure that livestock stocking rates are low enough so that residual grass cover is available. Rotational grazing systems should be implemented with a rotation length that is long enough to maintain quality nesting habitat with grass more than 10 inches tall. Integrating native warm-season grasses into your grazing system can provide areas for nesting cover and can also produce quality forage during the summer months and times of drought (Figure 11).

Figure 11. Native grasses can provide an excellent forage for livestock (left) and quality habitat for pheasants (right).

- Quality brood habitat consists of mixtures of grasses and forbs, with vegetation that is generally not as dense or as high as nesting cover. A good way to determine if you have good nesting and brood cover is to throw a football or tennis ball into the field around mid-April. If the ball disappears, adequate nesting cover is present; if not, the area is most suitable for brood cover (Figure 12).

Figure 12. Example of the types of vegetation and height required for nesting cover (left) and for brood cover (right).

- Leave a few outside rows of existing row crops standing near field edges. This practice is particularly valuable for grains crops such as corn, grain sorghum and winter wheat. Planting open-pollinated corn varieties in the outer rows can increase the protein available to wildlife if left standing.
- In areas deficient of row crops or forbs and legumes, food plots can be established. Alfalfa is a good choice as it is fairly drought tolerant and can persist for several years. Alfalfa is also attractive to insects and is not invasive. Annual grain crops, such as grain sorghum and corn, can also be used in food plots and managed in such a way as to leave half of the area fallow each year, encouraging the establishment of native annual forbs and legumes (Figure 13).

Figure 13. Row crops such as grain sorghum (left) and areas with native forbs and legumes (right) can provide sources of food and cover used by pheasants.

- Windbreaks and shelterbelts adjacent to fields of native grasses and forbs are extremely beneficial for pheasants throughout the year, including times of extreme winter weather (Figure 14).

Figure 14. Establishing windbreaks together with native grasses and forbs provides excellent habitats for pheasants.

- Minimize the use of pesticides and herbicides.
- Practice no-till farming to increase the amount of waste grain and cover available. Plant cover crop mixtures that contain small grains and legumes. In fields that are conventionally tilled, delay tillage until spring.

Conclusion

Management practices that can benefit ring-necked pheasants, as well as numerous other wildlife species requiring similar types of habitats, can be successfully integrated with your ongoing agriculture objectives. In addition to benefiting pheasants, many of the practices discussed in this guide could also increase crop yields and provide a livestock forage during times of drought.

Working with neighboring landowners to manage pheasant habitats over a larger landscape can produce significant advantages. Habitat management over a larger area can not only potentially increase pheasant populations but also provide additional benefits related to hunting and wildlife recreation opportunities.

For more information on managing your property for ring-necked pheasants, contact the Missouri Department of Conservation or biologists with Missouri Pheasants and Quail Forever. They can provide technical assistance and management recommendations and share information on the availability of conservation programs that can be used to implement habitat improvement projects on your property. MU Extension provides educational resources for managing ring-necked pheasants as well as many other wildlife species on your property. Refer to the links below for additional information.

Additional resources

- Missouri Pheasants and Quail Forever (missouripfqf.org)
- Missouri Department of Conservation
  - Pheasant management (mdc.mo.gov/your-property/improve-your-property/wildlife-management/pheasant-management)
  - Pheasant hunting (mdc.mo.gov/hunting-trapping/species/pheasant)
  - Pheasant and quail brood survey (mdc.mo.gov/hunting-trapping/species/pheasant/pheasant-quail-brood-survey)
- MU Extension Wildlife Ecology and Management (extension.missouri.edu/programs/wildlife-ecology-and-management)

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